

REGIONAL AIRPORT PLAN



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General Aviation Airports Final Report


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GENERAL AVIATION AIRPORTS

Final Report

author > Regional Airport Planning Committee

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I. INTRODUCTION

General aviation is the predominant user of airports and airspace in the Bay Area. The current study is the first major attempt to develop a comprehensive system plan for general aviation airports. The general aviation plan addresses the existing and future role of each airport, makes recommendations for new facilities, and discusses the relationship between proposed improvements and local plans and policies. The general aviation system plan is part of the Airport Element of the Metropolitan Transportation Commission's Regional Transportation Plan and the Association of Bay Area Government's Regional Plan.

Reasons for Revising the Plan

The plan needs to be revised because it contains inadequate information concerning:

- general aviation "needs."
- changing conditions affecting the character and growth in general aviation activity.
- the interrelationships between air carrier and general aviation activity, particularly with respect to the use of airspace.
- review criteria for addressing general aviation issues as they relate to individual airports and airport improvement projects.
- the increasing regional role in programming airport development funds for general aviation airports.

One of the principal issues addressed in the earlier Regional Airport System Study (RASS) was the adequacy of general aviation system capacity to meet projected demand. Demand (aircraft owners) was allocated to general aviation airports after taking into account planned improvements in airfield capacity. In order to replace some privately owned airports expected to close and to serve new demand in the region, it was recommended that eleven new airports would be needed.

Recommendations as to the number and location of new airports were later deleted from the Regional Transportation Plan pending the outcome of this study. Improvements to existing general aviation airports meeting criteria for "regional significance" have been approved on a continuing basis in order to protect and enhance the transportation role of these facilities.

What Will the Plan be Used For?

The plan provides the policy by which ABAG and MTC make decisions in the following areas:

1. Conformance of Local Plans and Projects with the Regional Airport Plan.
 - Airport Master Plans
 - Airport Land Use Commission Plans
 - Local Government General Plans
 - Airport Development Projects
 - Off Airport Land Use Proposals
2. Federal, State, and Local Actions Affecting General Aviation
 - Transportation Improvement Program (T.I.P.)
 - Airspace Rules and Procedures
 - Airport Restrictions
 - Fuel Allocation Programs
3. State and Federal Legislation Affecting Airport Planning
 - Airport and Airway Development Act
 - California Aid to Airports Program
 - Joint Use of Military Airports

II. SUMMARY

General aviation is one of several specialized transportation modes considered in the regional plan. The region's general aviation airports provide terminals for the transfer of passengers and cargo carried on business and personal flights. General aviation supplements existing modes of intercity transportation such as scheduled airline service, bus, rail, and the personal auto by providing air access to a number of locations that would be difficult or more time-consuming to reach by other means. This aspect of general aviation is a serious consideration in the regional plan, while the recreational aspect is of lesser importance. (The need for pilot training should not be confused with recreational flying.)

A historical problem for general aviation has been that of identity. The role that general aviation plays in the regional and national transportation network is not well understood, so it is sometimes hard to convince local governments to support projects that improve general aviation facilities. Local issues usually concern the economic benefits of a general aviation airport, noise from training flights, the possible use of airports by corporate jet aircraft, airport safety, vehicular traffic, and land use proposals off the airport. A regional level of interest seems necessary when the following factors are considered:

- a character of use that indicates travel from other parts of the region, the State and the U.S.
- a level of activity that indicates an important use of the region's airspace.
- a need to relieve activity at congested air carrier airports.
- a substantial use of airports by pilots who reside, or whose aircraft is kept, outside the political jurisdictions of the airport owner.
- a significant investment of public resources.
- instances where noise from aircraft operations affects adjacent communities.

Transportation Function

With respect to its transportation use, an MTC general aviation user survey conducted in 1976 found that 28% of the aircraft surveyed originated outside the MTC region. Statistics gathered by the general aviation industry show that one third of all intercity business trips are made in general aviation aircraft. The trend towards increased use of general aviation by business is closely related to other trends such as the growing dispersal of industrial plants and a contracting airline route system. Commuter airline service, an activity usually associated

with general aviation aircraft, is also becoming more important in the air transportation system. Commuter airlines will provide "essential air service" for communities that are losing service by large carriers under the freedom of entry and exit provisions of the Airline Deregulation Act.

Finally, at the personal transportation level, general aviation competes with the private car as a mode of intercity transportation. While not as energy-efficient as a bus or compact car, some aircraft are equal in efficiency to current mid-sized automobiles and have a significant travel time advantage.

Existing System

The existing regional general aviation airport system is defined to consist of 17 publicly owned airports and 11 privately owned airports. (See Figure II-1) A number of other airstrips exist but are not included in the regional plan because of the low level of activity. In 1978 there were approximately 5850 aircraft located in the region, 87% of which were accommodated at the publicly owned and operated airports. These aircraft made over 4 million takeoffs and landings. Eleven airports have FAA operated control towers; however, only two are currently equipped with a precision Instrument Landing System for exclusive use by general aviation aircraft. About 55% of all takeoffs and landings are made in the local traffic areas and are primarily training flights.

Demand Forecasts

It is difficult to measure demand in a way that directly addresses the functional role performed by general aviation in the regional transportation system. The most pertinent questions would be, "How many people need to fly from here to there?" "How much recreational flying will take place?" and "How much system capacity should be reserved for flight training?" Because these questions are very difficult to answer, demand is usually estimated in terms of the number of aircraft "based" in the Bay Area (i.e., parked at Bay Area airports).

In order to develop general aviation forecasts, a number of factors were reviewed, including population and employment growth in the region, the availability of airport facilities, the costs of aircraft ownership, the growing role of general aviation as a business tool, and the supply of fuel. Limitations in the data and in analytical methods constrained the use of many of these variables in an explicit formula for estimating aircraft ownership. It is also believed that the current shortage of aircraft parking space in the Bay Area probably obscures the true demand for general aviation facilities. The regional forecasts rely principally on population growth and secondarily on judgment in estimating future ownership trends. The "baseline" estimates indicate the potential based aircraft population in the Bay Area would be approximately 7400 aircraft in 1987 and 9600 aircraft in 1997 compared to about 5400 aircraft in 1977. (See Figure II-2)

Figure II-1

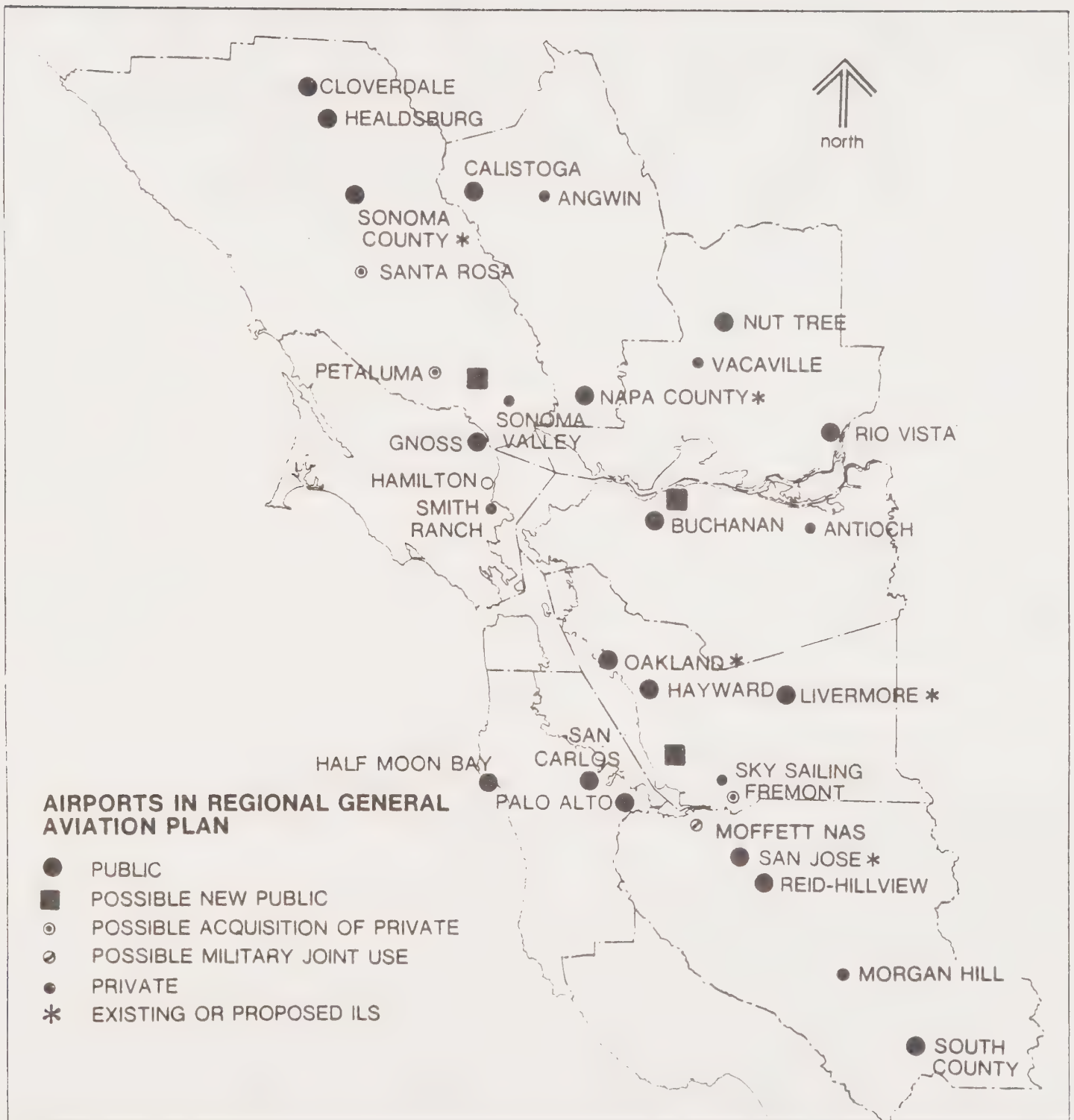
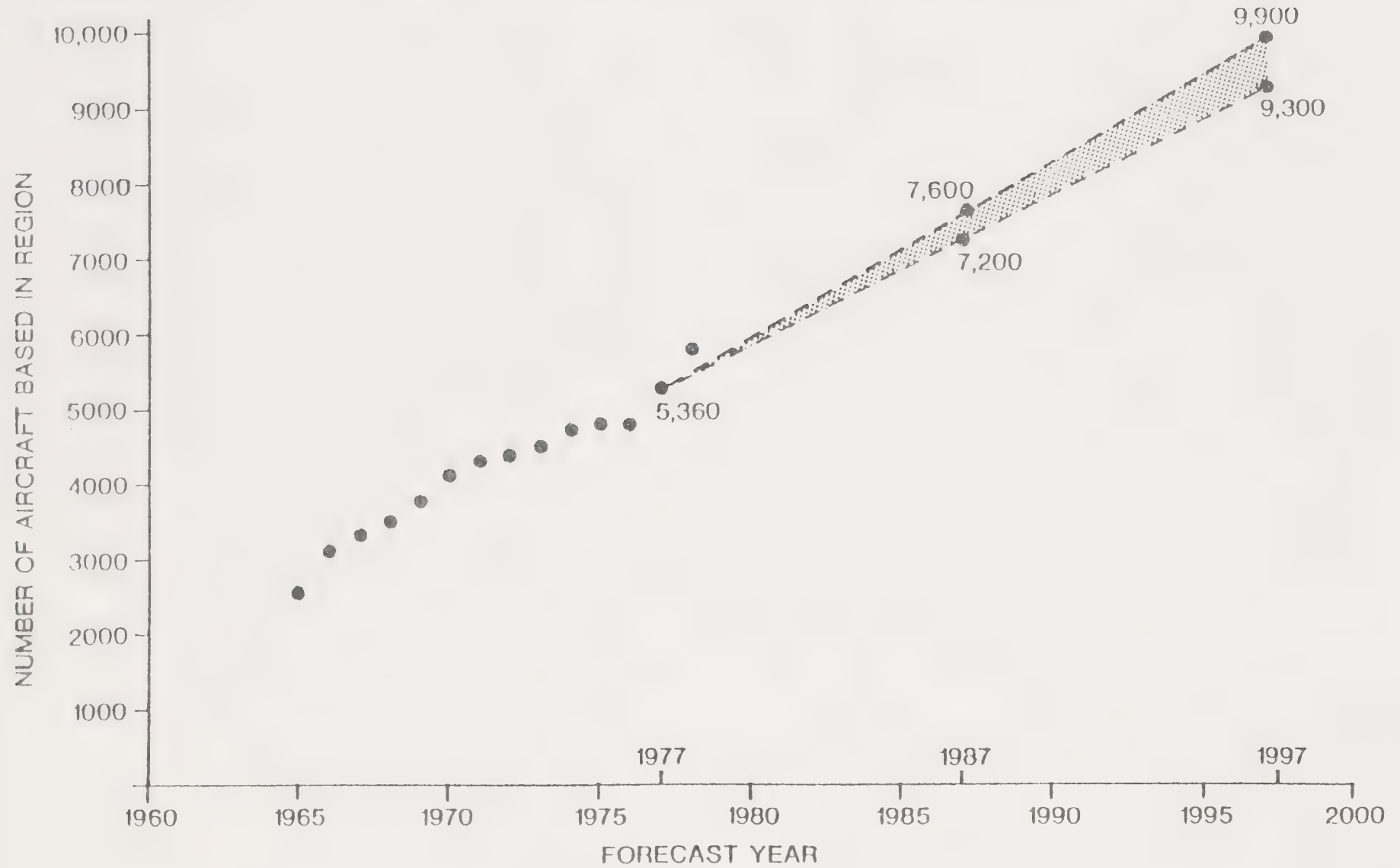


Figure II-2

PROJECTED GENERAL AVIATION AIRCRAFT IN REGION



There is a strong interdependence among local jurisdictions, each using the airports and airspace of others. Another important forecast, therefore, is the estimate of aircraft owner locations in the region. These estimates were prepared at the county level as well as by "440" zone and were used in evaluating alternative general aviation system plans.

Capacity Problems

Two measures of capacity are of concern: aircraft parking capacity and airport runway capacity. Analysis of capacity at the major general aviation airports shows the following conditions.

EXISTING AIRPORT UTILIZATION

<u>County</u>	<u>Airport</u>	<u>Percentage of Parking</u>	<u>Capacity Runway</u>
Alameda	Hayward	100%	90%
	Livermore	100	103
	Oakland	100	60
Contra Costa	Buchanan	100	77
Marin	Gross	100	97
Napa	Napa	68	71
San Mateo	Half Moon Bay	67	41
	San Carlos	100	112
Santa Clara	Palo Alto	100	110
	Reid-Hillview	100	82
	San Jose	100	62
	South County	50	21
Solano	Nut Tree	68	57
Sonoma	Sonoma County	100	82

Aircraft parking space is essentially filled at 10 airports in the region. At least 5 airports are close to the theoretical capacity of their runways. Because undeveloped land is available at most airports, it will be possible to increase aircraft parking capacity in the region; however, construction of additional runways is more constrained.

The major changes that might occur in the system include the following:

POTENTIAL CHANGES IN REGIONAL AIRPORT SYSTEM

<u>Possible New Runways</u>	<u>Possible New Public Airports</u>	<u>Possible Closures</u>	<u>Possible Joint Use</u>
<ul style="list-style-type: none"> ● Gross Field ● Livermore ● Palo Alto ● South County ● Sonoma County 	<ul style="list-style-type: none"> ● Alameda County (Fremont Area) ● Contra Costa County ● Marin County (Hamilton) ● Sonoma County (Petaluma, Santa Rosa, or new airport) 	<ul style="list-style-type: none"> ● Antioch ● Fremont Sky Sailing ● Morgan Hill ● Santa Rosa Air Center ● Smith Ranch ● Sonoma Skypark ● Vacaville 	<ul style="list-style-type: none"> ● Moffett Field

If all the current Master Plan recommendations were completed, the airport system could ultimately accommodate 9800 based aircraft and would have a cumulative runway capacity of 8.3 million annual operations. While this represents a large growth in capacity, not all of the capacity would be available for use because of the location of the airports with respect to the users of the system.

Airspace Capacity

General aviation makes over ten times as many operations as the major airlines and is the principal user of Bay Area airspace. More and more general aviation aircraft are being equipped with navigation equipment to operate in Instrument Flight Rules (IFR) weather.

A 1977 MTC airspace survey found that 18% of the instrument operations conducted in the central Bay Area airspace were made by general aviation aircraft. One concern in the regional plan is to ensure that adequate Instrument Landing System (ILS) facilities are available at general aviation airports in order to relieve traffic from the major air carrier runways. The location of new ILS facilities is also critical since excessive airspace interaction between two or more airports can actually limit airspace capacity.

Under Visual Flight Rules (VFR), aircraft operate on a "see-and-avoid" basis. VFR traffic is already heavily channelized due to the presence of the Terminal Control Area, local terrain, and airport traffic areas. General aviation plans need to consider the impact of added aircraft and runways in areas that are or will be heavily used by VFR aircraft. Also, it is important to review the areas and altitudes used for flight training as some areas are used by air carrier aircraft as well. These areas should be evaluated as to their ability to accommodate both types of activity.

Environment

Airport noise conditions vary among airports and locations. Urban airports such as Reid-Hillview, San Jose Municipal, Hayward, Oakland and Buchanan have or are developing procedures to minimize the impact of noise from training and business jet aircraft. The regional plan can recommend new facilities to handle training flights and can also recommend the purchase of "approach areas" off the airport to prevent future residential encroachment.

The analysis of Bay Area air quality has shown that general aviation's contribution to regional oxidant problems is not significant. Also, with the exception of San Jose Airport, local carbon monoxide concentrations around general aviation airports fail to show any exceedances of State and Federal standards.

Expansion of existing general aviation airports or development of new general aviation airports on the perimeter of the Bay or near major "wetland" areas will need to be reviewed with respect to Federal, State, and local plans for these environmentally sensitive areas.

Airport Financing

Funding will be a major constraint in the implementation of regional and local general aviation plans. Costs of labor and materials and land values are expected to escalate above historic rates, limiting the ability of airports to finance proposed improvements. There will probably be a shortage of local money to match Federal and State funds since most airport improvement projects must compete with other demands on shrinking general funds. The exception to this is when an airport has established an "enterprise" fund, that is a separate sinking fund to finance capital improvements.

Regional planning and programming are brought together in the preparation of the five year Transportation Improvement Program (T.I.P.). Airport and project priorities are established and matched to the funds available; this program is reviewed every year and constitutes the short range program for the general aviation system plan. The Regional Transportation Improvement Program includes approximately \$33 million in current dollars for improvements to general aviation airports.

Recommended Plan

The recommended plan provides a staged program for improving the Bay Area general aviation airports. The plan establishes a high priority for maintaining and improving existing publicly owned airports and for acquiring sufficient property to protect these airports from future residential encroachment. The plan recommends a moderate expansion in airport system capacity including the development of three new airports to provide training relief and increase aircraft storage capacity. (Two of the potential sites are existing private airports.) The plan also provides mechanisms for relieving general aviation traffic at the busy

air carrier airports by improving "reliever" airports and providing exclusive ILS (Instrument Landing Systems) for use by general aviation aircraft. Finally, the plan considers the consistency of the recommendations with local plans and policies and identifies areas of regional concern to be addressed in submitting future requests for airport development funds.

REGIONAL PLAN RECOMMENDATIONS

<u>Year</u>	<u>Demand[1]</u>	<u>Proposed Parking Capacity[1]</u>	<u>Proposed Runway Capacity[2]</u>	<u>Estimated Annual Operations[3]</u>
1977	5,360	6,200	7,155,000	4,000,000
1987	7,400	7,640	8,270,000	5,431,000
1997	9,600	9,100	8,270,000	6,743,000

Notes:

1. Number of aircraft.
2. Number of annual aircraft operations that could be handled.
3. Number of estimated takeoffs and landings based on proposed improvements.

III. POLICIES AND RECOMMENDATIONS

Goal: To develop a General Aviation System Plan for the region.

Objectives

- 1.1 The plan shall include those general aviation airports that are considered important to the regional system.
- 1.2 The plan shall identify the role of each existing and planned airport in the recommended regional system.
- 1.3 The plan shall contain a staged program for development of each airport.
- 1.4 Where recommendations are different from those in local plans and airport master plans, the plan shall identify issues of overriding regional significance.
- 1.5 The plan shall consider possible constraints on the development of the general aviation system including but not limited to, airspace capacity, noise, air quality, and impact on Bay waters and wetlands.
- 1.6 The plan shall identify issues that require cooperation among local governments and among local governments and the region.
- 1.7 The plan shall contain generalized project review concerns to provide guidance to airport operators when submitting projects for regional review under OMB Circular A-95 and under California Government Code Sec. 66520.
- 1.8 The plan shall be submitted to the State and shall represent the region's input to the California Airport System Plan. The plan shall also be used to amend and revise the National Airport System Plan.

Policies

- 1.1 Every effort shall be made to maintain the capability of the general aviation system to provide essential transportation services.
- 1.2 A high priority shall be attached to preserving, maintaining, and improving existing publicly owned general aviation airports in the region.
- 1.3 Development of new publicly owned airports shall be approved if such airports are a) consistent with the regional plan, b) consistent with local plans and policies, and c) are protected by adequate long range zoning controls for surrounding land uses.

- 1.4 Development of new airports or expansion of existing facilities shall not be recommended if such actions would seriously compromise airspace safety or efficiency.
- 1.5 In order to promote airspace safety and efficiency, adequate VFR and IFR training facilities shall be developed for exclusive use by general aviation. VFR training areas should be regulated to the extent required to prevent conflict with air carrier and military operations.
- 1.6 Airport operators shall make every effort to be a "good neighbor" and implement flight procedures that minimize the impact of aircraft operations on local communities.
- 1.7 Local plans and policies should recognize the importance of general aviation airports and provide adequate zoning protection.
- 1.8 Projects involving major airport expansion or major changes in the use of a facility that are submitted for regional review under OMB Circular A-95 or California Government Code Sec. 66520 shall address the "regional concerns" outlined in the general aviation plan.
- 1.9 Where local plans call for aircraft parking development in excess of levels shown in the regional plan, regional review of these projects shall pay particular attention to a) airspace interactions, b) community noise impacts, and c) methods to manage demand consistent with available runway capacity (e.g. development of reliever training airports or "bounce" strips, restrictions on training activity, relocation of flight training schools).
- 1.10 Projects submitted for Federal or State funding shall be included in an approved Airport Master Plan or Airport Layout Plan.
- 1.11 The adopted Regional Transportation Improvement Program, as it is annually reviewed and revised, shall be the basis for programming general aviation airport improvement funds in the region.
- 1.12 The region supports the development of user fees for improvements to general aviation airports.
- 1.13 General aviation airport plans shall consider the need for commuter airline facilities and services.
- 1.14 Possible future Short Takeoff and Landing aircraft (STOL) operations at general aviation airports would not normally be considered consistent with the plan unless the airport operator owns in fee simple the maximum approach area recommended in FAA standards for the appropriate runway instrumentation category.

Recommended Plan

The recommended general aviation plan is shown in Table III-1 and accomplishes the following objectives:

- Provides an increase in system capacity but does not serve all of the projected long range demand.
- Maximizes the use of existing facilities, with particular emphasis on upgrading airports that relieve the congestion at air carrier airports. The recommended plan recognizes the inherent cost and operational efficiencies that result from the incremental expansion of existing facilities. Expansion of existing facilities is also the most productive way to increase system capacity over the short term, since planning and development of new airports can take many years. Existing airports are usually close to major population centers and are therefore the most convenient for the users.
- Recognizes the potential for three new airports in Contra Costa, Alameda, and Sonoma Counties, two of which may be provided through acquisition of existing private airports.
- Minimizes airspace interactions by locating major new capacity away from congested airspace. The recommended plan would produce a modest increase in activity at airports that rim the Bay; however, the most significant increases in system capacity would occur at more remote sites such as South County, Livermore, Sonoma County, Gness Field, Nut Tree, and potential new airports in Contra Costa and Sonoma Counties.
- Explicitly considers the need for adequate training facilities--both VFR and IFR. IFR training relief for San Jose would be provided by installation of a full Instrument Landing System (ILS) at Livermore Airport. The critical lack of training capacity in the South Bay would be solved in the short term by exploring joint use of Moffett Field NAS with the Navy, and in the long term by new runways at Fremont (preferred) or Palo Alto. The recommended development of a new airport in Contra Costa County would relieve training activity at Buchanan.
- Considers Regional and Local Plans and Policies. The general aviation plan recognizes the recommendations developed through FAA-sponsored airport master planning studies and incorporates these recommendations in the plan as appropriate. The general aviation plan further recognizes the preparation of the Baylands Master Plan by the City of Palo Alto and the Bay Plan developed by the Bay Conservation and Development Commission (BCDC).
- Continues the program priorities established in the five year Regional Transportation Improvement Program (T.I.P). These priorities reflect the following major programming goals for federal and state airport development funds.

- a) Improve safety of existing airports.
 - b) Maintain facilities at existing airports.
 - c) Improve efficiency of existing airports.
 - d) Protect existing airports from future encroachment and minimize adverse environmental impacts.
 - e) Acquire land now to meet future airport needs.
 - f) Expand aircraft parking space to meet existing and future requirements.
 - g) Construct new runways to provide additional capacity and reduce runway congestion.
- Identifies areas of regional interest in project review. Table III-1 indicates those areas that the region is likely to be concerned with based on the analysis conducted for this study. This table is intended to serve as a general guide to sponsors in submitting projects for A-95 review.
 - a) Airspace--indicates interactions with other airports or growing congestion in channelized traffic routes adjacent to these airports.
 - b) Noise--indicates need to review impact of increased operations on surrounding communities.
 - c) Air quality--generally carbon monoxide, and indicates the airport is in an area where attainment of ambient air quality standards may be difficult.
 - d) Bay--indicates need to review issues related to Bay fill or the Bay habitat, including wetland areas.
 - e) Land Use--indicates concern with existing or proposed land use around airports.
 - f) Coordination--indicates need to coordinate with other jurisdictions.

Specific areas of concern will be discussed with the airport sponsor prior to preparation of major project funding applications. Major projects are projects that will significantly increase airport capacity or change the character of airport use or projects that have the potential for significant adverse environmental effects.

- Identifies areas where local policy clarification is required to make the plan more explicit or where additional study is required. The regional plan recommends that:

- a) Sonoma County develop a countywide plan for airport improvements and that the plan include project priorities and costs. The ultimate role of Petaluma Airport and the Santa Rosa Air Center are key issues.
- b) Marin County determine how future general aviation growth will be handled in the county including a comparative study of Gnoss Field and Hamilton Airport.
- c) Santa Clara County update the Master Plans for Palo Alto, Reid-Hillview, and South County Airports and consider potential joint use of Moffett Field NAS in its plans.
- d) MTC work with Fremont, San Jose, and Palo Alto to conduct a Site Selection/Master Plan study for a new airport in the Fremont area.

Table III-1
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

Airport	Time Frame	Status	Aircraft Parking ¹	New Runways	Runway Capacity ²	Aircraft Operations ³	NAVAIDS ⁴	Project Review Concerns	Comments
Oakland (Ala 1.1)	S		825		600,000			Airspace	
	M		825			562,000			
	L		900			600,000			
Hayward (Ala 1.2)	S		530		500,000			Airspace, Noise	
	M		600			374,000			
	L		705			500,000			
Livermore (Ala 1.3)	S		400	●	500,000		●	Land Use	Development of South Side yields ultimate parking capacity.
	M		400			285,000			
	L		550			445,000			
Fremont (Ala 1.4)	S	Possible	90					All	Perform Site Selection/Master Plan Study.
	M	Land	150	○	500,000	333,525	○		
	L	Acquisition	250			423,500			
Fremont Sky Sailing (Ala 1.5)	S	Possible	12		115,000			Gliderport.	
	M	Closure	12						
	L		12						
Buchanan (CC 1.1)	S		540		485,000			Noise, Land Use	Development of West Side yields ultimate parking capacity.
	M		700			393,000*			
	L		780			440,000*	○		
New Reliever (CC 1.2)	S	New	75	●	250,000			All	Under study.
	M		75			134,000	○		
	L		180	○		250,000			
Antioch (CC 1.3)	S	Possible	70		115,000	46,000		Land Use	Status uncertain pending outcome of County reliever airport study.
	M	Closure	*						
	L		*						
Gross (M 1.1)	S		275					Bay	Future role related to decision on Hamilton.
	M		330	○	370,000	272,000			
	L		445			370,000			

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
M = Medium (5-10 years)
L = Long (10-20 years)

● ILS or New Runway
○ Possible ILS or New Runway
* Assumes diversion of some training

Table III-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

Airport	Time Frame	Status	Aircraft Parking ¹	New Runways	Runway Capacity ²	Aircraft Operations ³	NAVAIDS ⁴	Project Review Concerns	Comments
Hamilton (M 1.2)	S	New	350	○	250,000	328,000 400,000	○	Airspace, Land Use	"Proposals" reflect role of Hamilton as replacement for Gness and Smith Ranch.
	M		410		400,000				
	L		500						
Smith Ranch (M 1.3)	S	Possible Closure	75		115,000	48,600			
	M		75						
	L		75						
Napa Co. (N 1.1)	S		230		490,000	398,000 377,000	●		
	M		280						
	L		380						
Angwin (N 1.2)	S		25		145,000	16,000			
	M		25						
	L		25						
Calistoga (N 1.3)	S	Possible Closure	12		145,000				Gliderport.
	M		12						
	L		12						
San Carlos (SM 1.1)	S		490		270,000	245,000* 245,000*		Bay	Runway extension proposed in regional plan.
	M		490						
	L		490						
Half Moon Bay (SM 1.2)	S		100		180,000	180,000 180,000		Land Use	
	M		150						
	L		150						
Palo Alto (SC 1.1)	S		510	○	265,000	240,000* 240,000*		Coordination (City of Palo Alto)	Second runway least preferred alternative for providing training capacity in South Bay,
	M		510						
	L		510						
Reid-Hillview	S		730		500,000	387,000 387,000			
	M		730						
	L		730						

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
M = Medium (5-10 years)
L = Long (10-20 years)

● ILS or New Runway
○ Possible ILS or New Runway
* Assumes diversion of some training

Table III-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

Airport	Time Frame	Status	Aircraft Parking ¹	New Runways	Runway Capacity ²	Aircraft Operations ³	NAVAIDS ⁴	Project Review Concerns	Comments
San Jose Municipal (SC 1.3)	S M L		565 804 804		660,000	450,000* 450,000*		Airspace, Air Quality	Master planning study recommends development of West Side for general aviation.
South County (SC 1.4)	S M L		270 270 500	●	500,000	270,000 500,000	○	Land Use	Major expansion needed to serve County demand.
Moffett Field NAS (SC 1.5)	S M L	Possible Joint Use	None					Airspace, Noise	Moffett could be used on interim basis for training relief in South Bay.
Morgan Hill (SC 1.6)	S M L	Probable Closure	45 * *		115,000	29,000			
Nut Tree (Sol 1.1)	S M L		140 170 250		250,000	203,000 250,000		Land Use	Potential residential encroachment on West Side.
Rio Vista (Sol. 1.2)	S M L		60 60 80		145,000	48,000 95,000			City considering relocation of airport.
Vacaville (Sol 1.3)	S M L		10 10 10		115,000				Gliderport.
Sonoma Co. (Son 1.1)	S M L		400 550 770	●	500,000	283,000 400,000		Land Use	Need to protect approach areas.
Santa Rosa (Son 1.2)	S M L	Consider Public Acquisition	250 250 250		115,000			Airspace, Land Use, coordination (region & Sonoma)	Potential new public airport. Conduct Master Plan study to determine feasibility.
Notes:	1) Excludes Transient Parking 2) Annual Service Volume-Assumes Increased Utilization 3) Annual Takeoffs and Landings 4) Navigational Aids					S = Short (0-5 years) M = Medium (5-10 years) L = Long (10-20 years)	● ILS or New Runway ○ Possible ILS or New Runway * Assumes diversion of some training		

Table III-1 (Cont'd)
SUMMARY OF GENERAL AVIATION PLAN PROPOSALS

<u>Airport</u>	<u>Time Frame</u>	<u>Status</u>	<u>Aircraft Parking¹</u>	<u>New Runways</u>	<u>Runway Capacity²</u>	<u>Aircraft Operations³</u>	<u>NAVAIDS⁴</u>	<u>Project Review Concerns</u>	<u>Comments</u>
Petaluma (Son 1.3)	S	Consider	70	○	115,000	46,000		Land Use, coordination (region & Sonoma)	Potential new public airport. City plans to acquire and improve existing private airport.
	M	Public	150		250,000	135,000			
	L	Acquisition	250			225,000			
Healdsburg (Son 1.4)	S		60		145,000	75,000			
	M		80			100,000			
	L		110			138,000			
Cloverdale (Son 1.5)	S		12		145,000	15,000			Permit expires in 1980.
	M		30			38,000			
	L		36			45,000			
Sonoma Valley (Son 1.7)	S		100		145,000	65,000			Private airport performing a unique role. Airport should be retained.
	M		100						
	L		100						
New Sonoma (Son 1.8)	S		100	○	250,000			All	Potential new public airport. Earlier study recommended site near Sonoma Skypart, but no action taken.
	M		150						
	L		250						

Notes:

- 1) Excludes Transient Parking
- 2) Annual Service Volume-Assumes Increased Utilization
- 3) Annual Takeoffs and Landings
- 4) Navigational Aids

S = Short (0-5 years)
M = Medium (5-10 years)
L = Long (10-20 years)

● ILS or New Runway
○ Possible ILS or New Runway
* Assumes diversion of some training

IV. EXISTING AIRPORT SYSTEM

The existing regional general aviation airport system consists of over thirty publicly and privately owned airports. In addition, there are a number of private use airstrips, heliports, and seaplane bases that perform specialized aviation services. Some of these airports are of regional significance while others are not.







In 1978 it is estimated that there were about 5840 general aviation aircraft located in the Bay Area. These aircraft performed some 4 million annual takeoffs and landings. About 55% of the aircraft operations were local training flights.

The following tables provide information concerning the facilities at each of the existing airports in the Bay Area. Additional information on historical levels of activity at major airports can be found in the Appendix.







Figure IV-1
GENERAL AVIATION AIRPORTS




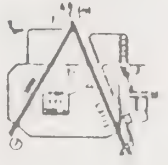




GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (Including FBO)			Ownership
			Based Aircraft	Annual Ops.*		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
ALAMEDA COUNTY Hayward Air Terminal		442	505	392,678	Yes	2	10L-28R 10R-28L	3543 X 75 5156 X 150	Asphalt Asphalt	MIRL MIRL,RTL	Partial ILS VASI *Non-Precision Instrument Approach	599	91	509	Public
Livermore Municipal		257	250	206,000	Yes	1	07-25	4000 X 100	Asphalt	MIRL	VASI *Non-Precision Instrument Approach	347	127	220	Public
Oakland North Field		980	600	378,296	Yes	3	27L-9R 27R-9L 15-33 (crosswind)	6211 X 150 5450 X 150 3400 X 75	Asphalt Asphalt Asphalt	MIRL ALS, MALS-RAIL None	ILS (CAT I)	600	43	557	Public
CONTRA COSTA COUNTY Buchanan		530	530	355,381	Yes	4	1L-19R 1R-19L 14L-32R 14R-32L	4700 X 150 2768 X 75 4600 X 150 2800 X 75	Asphalt Asphalt Asphalt Asphalt	MIRL,REIL MIRL MIRL None	VASI, LOC, MALS *Non-Precision Instrument Approach	580	150	430	Public
NAPA COUNTY Napa County		735	180	194,446	Yes	3	18R-36L 18L-36R 06-24	5932 X 150 2500 X 75 5008 X 150	Concrete Concrete Concrete	MIRL MIRL	*Non-Precision Instrument Approach	263	36	227	Public
MARIN COUNTY Guass Field		91	210	225,000	No	1	13-31	3300 X 60	Asphalt	MIRL	VASI	230	25	205	Public





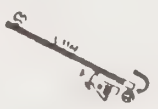

GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (Including FBO)			Ownership
			Based Aircraft	Annual Ops. ^A		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
SAN MATEO COUNTY San Carlos		112	456	263,393	Yes	1	12-30	2600 X 75	Asphaltic Concrete	MIRL, REIL	VASI	485	126	359	Public
Half Moon Bay		322	60	92,000	No	1	12-30	5000 X 150	Asphalt	MIRL	VASI	110	33	77	Public
SANTA CLARA COUNTY Palo Alto		182	426	243,293	Yes	1	12-30	2500 X 75	Asphalt	MIRL, REIL	VASI	455	46	409	Public
Red-Hillview		179	728	401,840	Yes	2	13L-31R 13R-31L	3100 X 75 3100 X 75	Asphalt Asphalt	MIRL, REIL	VASI	730	112	618	Public
San Jose Municipal		1000	548	385,032	Yes	3	12L-30R 12R-30L 11-29	4419 X 150 8900 X 150 3000 X 40	Asphalt Asphalt Asphalt	MIRL MIRL, RAIL None	VASI ILS	550	211	339	Public
South County		150	40	55,200	No	1	14-32	3100 X 75	Armour Coating	None		62	0	62	Public





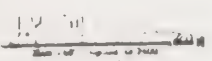
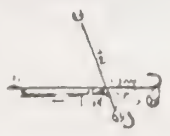
GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (Including FBO)			Ownership
			Based Aircraft	Annual Ops. ^A		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
SONOMA COUNTY Nut Tree		198	82	110,000	No	1	01-19	3800 X 75	Asphalt	MIRL	VASI REIL	120	23	97	Public
SONOMA COUNTY Sonoma County		940	300	180,725	Yes	2	14-32 01-19	5000 X 150 5000 X 150	Asphaltic Concrete Asphaltic Concrete	HIRL, MIAL REIL, MALSR None	ILS	315	135	180	Public
ALAMEDA COUNTY Fremont		89	90	93,000	No	2	13R-31L 13L-31R	2287 X 40	Asphalt Dirt	None		6	0	66	Private
Fremont Sky Sailing		25	30	100,000	No	1	10-28	3480 X 30	Oil Stabilized	None		35	10	25	Private
CONTRA COSTA COUNTY Antioch Airport		30	70	54,000	No	1	9-27	2503 X 33	Asphalt	LIRL		56	6	50	Private
MARIN COUNTY Smith Ranch		8	75	15,000	No	1	04-22	2138 X 30	Asphalt			75	55	20	Private




GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (Including FBO)			Ownership
			Based Aircraft	Annual Ops.*		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
<u>NAPA COUNTY</u> Angwin		20	31	10,000	No	1	15-33	5400 X 35	Asphalt/Dirt	None		33	4	29	Private
Calistoga Air Park		41	8	55,000	No	1	10-28	2627 X 30	Asphalt/Dirt	None		31	1	30	Private
Pope Valley		20	2	1,000	No	1	10-28	3700 X 40	Asphalt	None		3	0	3	Private
<u>SANTA CLARA COUNTY</u> Morgan Hill		20	41	6,800	No	1	13-31	3430 X 30	Asphalt	ATL		36	25	11	Private
<u>SONOMA COUNTY</u> Cloverdale Municipal		58	12	1,200	No	1	14-32	3166 X 60	Paved	LIRL		36	6	30	Public
Healdsburg Municipal		30	30	18,000	No	1	13-31	3025 X 45	Asphalt	Yes		60	14	46	Public

GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (including FBO)			Ownership
			Based Aircraft	Annual Ops. ^a		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
Petaluma Sky Ranch		223	70	50,000	No	1	11-29	2100 X 50	Asphalt	MIRL		54	18	36	Private
Santa Rosa Air Center		500	102	44,000	No	1	16-34	7000 X 200	Concrete	None		222	22	200	Private
Sea Ranch		60	0	0	No	1	12-30	2600 X 40	Asphalt	None		20	0	20	Private
Sonoma Valley Airport		12	75	50,000	No	2	7-25	2560 X 100 2100 X 100	Turf Turf	None		75	30	45	Private
Sonoma Sky Park		28	32	4,000	No	1	7-25	2500 X 50	Asphalt	LIRL		72	32	40	Private
SOLANO COUNTY Rio Vista Municipal		156	42	36,000	No	2	7-25 14-32	3231 X 61 1960 X 30	Asphalt Asphalt	LIRL		71	28	43	Public

GENERAL AVIATION AIRPORTS

Airport	Schematic	Acreage	1978 Activity		Control Tower	Runways					Navigational Aids	Total Aircraft Parking Spaces Available (Including FBO)			Ownership
			Based Aircraft	Annual Ops. ^A		No.	Orientation	Length X Width (feet)	Surface	Lighting		Total	Covered	Un-covered	
Maine Prairie		10	9	101,000	No	1	16-34	1925 X 50	Gravel	None		9	1	8	Private
Vaca-Dixon		40	5	500	No	2	16-34 18-36	2814 X 60 2080 X 50	Dirt Treated Dirt	None None		14	5	9	Private
Vacaville		75	8	10,000	No	1	18-36	2100 X 75	Asphalt	None		48	5	43	Private

^AOperations at non-towered airports are estimates

V. DEMAND FORECASTS

General aviation demand estimates include the following:

- Number of Aircraft in the Region
- Distribution of Aircraft Owners by County
- Number of Aircraft Takeoffs and Landings
- Number of Instrument Operations

Number of Aircraft in the Region

The major factors considered in the general aviation forecasts were regional population growth, aircraft ownership costs, fuel availability, and other industry trends.

- Population - There has been a persistent and statistically reliable relationship between regional population and the number of aircraft located in the region. Population growth was the principal variable used to project the number of aircraft located ("based") in the region.
- Aircraft Ownership Costs - Though the cost of owning an aircraft has risen significantly in recent years, this trend is difficult to define in quantitative terms. Costs vary tremendously by type of aircraft and locale. There is some evidence that the combined costs of aircraft financing, tiedown fees, aircraft insurance, and aircraft maintenance has risen to a level that begins to affect personal ownership. (Surprisingly, however, the cost of a new single engine aircraft--the mainstay of the general aviation fleet--increased at a slower rate than national inflation until 1976.) While precise statistical relationships between costs and ownership cannot be established on a historical basis, it is believed that there will be greater multiple ownership of aircraft to reduce the cost to the individual. This trend will be gradual since many individuals will continue to prefer the convenience of sole ownership.
- Fuel Availability - General aviation consumes about 0.6% of the petroleum used for transportation and 7% of the petroleum used by civil aviation. Aviation gasoline is made from the same part of the oil barrel as gasoline for automobiles and will compete with the car for future supplies. Potential shortages could affect both the purchase of aircraft as well as the amount of flying conducted.

- Other Factors - Business has found general aviation aircraft to be a useful tool. In fact, about 90% of all new aircraft are being purchased by businesses. The availability of landing fields and places to park new aircraft also needs to be considered. Many small private airstrips could close and improvements at publicly owned airports may not keep pace with growing demand. The resultant overcrowding could inhibit the sale of aircraft in the region. Finally, there has been a decline in the number of students completing flight training courses in recent years, (and there will be further retirement of the older pilots trained during the wars). This decline has been discounted as a major factor in the Bay Area forecasts.

All factors considered, regional forecasts suggest the potential aircraft population in the Bay Area could be between 7200 and 7600 aircraft in 1987 and between 9300 and 9900 aircraft in 1997 (see Table V-1). These forecasts were used as a "baseline" forecast in order to determine the types of improvements that would be required to serve the projected demand and the impact of airport improvement projects at one airport on other airports in the system. A number of factors may constrain the region from accommodating the entire projected demand.

Distribution of Aircraft Owners by County

Changing population, employment, and income patterns within the region will affect the location of future aircraft owners. Significant increases in ownership are projected for Alameda, Santa Clara, Contra Costa, and Sonoma Counties. The number of owners located in the other counties will also increase but at a comparatively lower rate. Table V-1 shows the county ownership projections.

Number of Aircraft Takeoffs and Landings

The number of annual aircraft takeoffs and landings at each airport was estimated from an empirically derived aircraft utilization factor, that is, the average number of annual takeoffs and landings performed by each based aircraft. Annual aircraft utilization varies at each airport and is indicative of the services provided, the presence of special activity generators, (e.g., restaurants, major flight training schools), and the amount of training activity that takes place. While definitionally tied to based aircraft, annual aircraft utilization encompasses the entire range of activity conducted by local and itinerant aircraft. Fluctuations in yearly aircraft utilization levels appear to be strongly related to prevailing economic conditions and to changes in the amount of training activity performed.

At the busier airports with control towers there is a downward trend in annual utilization as the airport runways approach capacity and new aircraft continue to be added to the based aircraft population. This occurs as training activity at these airports reaches a fairly constant level or is diverted to other nearby airports. For the purpose of this analysis, aircraft utilization at towered airports was frozen at current

TABLE V-1

Percentage of General Aviation Aircraft by County

County of Ownership	<u>1968</u>	<u>1976</u>	<u>1987</u>	<u>1997</u>
Alameda	19.7%	18.9%	17.4%	16.7%
Contra Costa	10.9	11.7	13.6	14.4
Marin	5.1	5.5	5.5	5.5
Napa	2.6	3.0	2.9	2.8
San Francisco	5.4	3.2	2.8	2.8
San Mateo	16.1	13.6	11.2	10.4
Santa Clara	28.2	31.5	30.4	28.4
Solano	3.1	3.5	4.5	5.6
Sonoma	<u>8.9</u>	<u>9.1</u>	<u>11.7</u>	<u>13.4</u>
	100.0	100.0	100.0	100.0

Forecasted Number of Aircraft Owners by County

	<u>1976</u>	<u>1987</u>	<u>1997</u>
Alameda	896	1290	1610
Contra Costa	556	1000	1370
Marin	261	410	530
Napa	141	220	270
San Francisco	150	210	270
San Mateo	642	830	1000
Santa Clara	1494	2260	2740
Solano	166	330	540
Sonoma	<u>434</u>	<u>870</u>	<u>1290</u>
Total	4740	7420	9620

levels rather than assuming a continuation of the trend in decreasing utilization. This assumption provides a more realistic picture of future deficiencies in runway capacity.

It is difficult to determine annual aircraft utilization at non-towered airports. Counts have been taken at a few of the regionally important airports such as Gross Field and Half Moon Bay; however, these were conducted on a sporadic basis and do not facilitate an evaluation of historical patterns. Aircraft utilization factors for non-towered airports were therefore based on:

- counts where available,
- discussions with airport operators,
- the 1975 General Aviation Survey conducted nationally by the FAA, and
- the survey of general aviation activity conducted by the State of California in 1972.

It was determined that a utilization factor of 1,200 annual operations per aircraft should be used at publicly owned airports without control towers compared to 650 annual operations per aircraft at privately owned airports without control towers.

Number of Instrument Operations

The number of instrument operations generated by each airport is a critical element in the assessment of Bay Area airspace capability. The ratio of instrument operations to total aircraft operations at each airport was extrapolated from historical trends. At existing instrument airports (i.e., general aviation airports with IFR approaches), the ratios calculated in this manner show an increasing proportion of operations will be instrument operations. This is consistent with the trend towards greater instrument capability in the general aviation fleet as a whole. Instrument operations at some airports (e.g., Livermore or San Jose) may be higher or lower than forecasted from historical trends as a result of programs to divert IFR training activity from air carrier airports.

VI. AIRPORT SYSTEM CAPACITY

Runway Capacity Estimates

- **Annual Service Volume.** Runway capacity was calculated at each airport using a new methodology recommended by the FAA to determine Annual Service Volume. Annual Service Volume is the number of annual aircraft movements that could theoretically be handled under a specific set of assumptions. The concept of Annual Service Volume is based on the observed phenomenon that, at a certain level of activity, the average delay to aircraft during the year will increase rapidly with relatively small increases in aircraft operations, thereby causing levels of service on the airfield to deteriorate. The level of operations at which delay begins to increase rapidly is called the Annual Service Volume. As a general rule, when annual airport activity is equal to the annual service volume, the average delay to each aircraft throughout the year is in the order of one to four minutes.
- **Factors Affecting Runway Capacity.** The major factors entering into the capacity calculation include the following:
 - mix of aircraft types
 - runway configuration and use (single, parallel, "v")
 - availability and location of runway exits
 - arrival/departure ratio
 - hourly and daily pattern of use
 - percentage of training activity
 - weather conditions (percentage of visual and instrument weather)
 - instrument approach aids
 - air traffic control procedures
- **Assumptions.** The calculated capacity of an airport's runway system will vary depending on the assumptions made with respect to the factors above. The results shown in Table VI-1 for "Future Capacity" generally assume that:
 - a) The availability of runway exits will not constrain capacity.
 - b) The approximate percentage of "Touch and Go" training operations will remain the same (a reduction in the proportion of Touch and Go activity would actually result in a lower theoretical capacity).
 - c) There will be a gradual change in the pattern of airport use resulting in a more even distribution of activity throughout the day as congestion increases during peak periods.

New runways are shown for some airports in accordance with airport master plan recommendations.

Table VI-1

AIRPORT RUNWAY CAPACITY

(Annual Operations)

<u>Airport</u>	<u>Number of Runways</u>	<u>Existing Capacity</u>	<u>Future Capacity</u>	
			<u>Low</u>	<u>High</u>
Hayward	2	390,000	505,000	575,000
Livermore	1	180,000	240,000	270,000
	2*	*	485,000	550,000
Oakland North	3	420,000	525,000	600,000
Buchanan	4	390,000	485,000	550,000
Gross Field	1	170,000	225,000	260,000
	2*	*	325,000	370,000
Hamilton	1	*	250,000	290,000
	2*	*	370,000	400,000
Napa	3	280,000	490,000	560,000
Palo Alto	1	180,000	250,000	285,000
	2*	*	480,000	540,000
Reid-Hillview	2	330,000	500,000	575,000
San Jose	3	660,000	660,000	675,000
South County	1	145,000	250,000	285,000
	2*	*	500,000	575,000
Half Moon Bay	1	145,000	180,000	250,000
San Carlos	1	185,000	250,000	285,000
Nut Tree	1	160,000	250,000	285,000
Sonoma	2	170,000	250,000	285,000
	3*	*	500,000	570,000

Airports Having an Approximate Runway Capacity of 145,000 Annual Operations

- Angwin
- Calistoga
- Rio Vista
- Healdsburg
- Cloverdale
- Santa Rosa

Airports Having an Approximate Runway Capacity of 115,000 Annual Operations

- Fremont
- Fremont Sky Sailing
- Antioch
- Smith Ranch
- Morgan Hill
- Vacaville
- Petaluma
- Sonoma Skypark
- Vaca-Dixon
- Maine Prairie

*Potential new runways

Aircraft Parking Capacity

Table VI-2 shows the planned increases in aircraft parking capacity at each airport according to existing airport master plans. (Figures do not include parking requirements for transient aircraft.)

Table VI-2
FUTURE AIRCRAFT PARKING CAPACITY

<u>Airport</u>	<u>Existing Capacity</u>	<u>Master Plan Recommendation</u>
Hayward	599	850
Livermore	347	500
Oakland	600	1000
Buchanan	580	840
Gross Field	263	490
Napa County	230	490
San Carlos	485	650
Half Moon Bay	110	250
Palo Alto	455	510
Reid-Hillview	730	730
San Jose Municipal	550	804
South County	62	500
Nut Tree	120	290
Healdsburg	60	110
Sonoma County	315	770

VII. EVALUATION OF ALTERNATIVES

The Bay Area general aviation airport managers played a major role in reviewing the assumptions to be used in the regional general aviation plan. The principal assumptions concerned:

- the extent to which better management of demand would increase existing airport capacity
- potential improvements in aircraft parking and runway capacity
- the likelihood that certain privately owned airports would close or be acquired for public use
- the potential for joint use of military airports

Managing Demand to Make Better Use of Existing Capacity

In assessing the need for new airport capacity, the regional plan first considers the gains that could be achieved through more optimum use of existing runways. If demand could be more evenly distributed throughout the days of the week and hours of the day, the volume of activity accommodated by existing runways could be increased. The analysis of future capacity requirements assumes that there will be a natural trend towards greater off-peak runway utilization resulting from increased inconvenience and costs during congested periods of the day. At airports that have land available for additional aircraft parking but are constrained by runway capacity, restrictions on training activity have been considered. These restrictions would require either an absolute reduction in the number of training operations or a shift in operations to nearby airports with available runway capacity. Such restrictions could be implemented either through agreements with flying schools or through recommended changes in the business activity on the airport resulting from a comprehensive master planning study.

Potential Improvements in Aircraft Parking and Runway Capacity

FAA-sponsored master planning programs conducted at Bay Area general aviation airports have produced a number of recommendations for improving airport capacity over the next 20 years. These recommendations have been described in Section VI and have been given detailed consideration in the preparation of the regional general aviation system plan.

Private Airports

There is a possibility that the following privately owned airports will be lost to the system as a result of continuing urbanization of adjacent land and rapidly appreciating land values:

- Morgan Hill
- Antioch
- Calistoga
- Fremont Sky Sailing
- Smith Ranch
- Sonoma Skypark
- Vacaville

There is a possibility that the following private airports may be acquired for public use:

- Fremont - Public development of the existing privately owned Fremont Airport (to be considered as part of an Airport Site Selection/Master Plan Study)
- Petaluma - Public acquisition and development of the existing privately owned airport. The runway would be relocated to the east. Parking would be provided for up to 280 aircraft.

Potential for Joint Use of Military Airports

There is a possibility that Moffett Field Naval Air Station could be used by general aviation for pilot training. This would require making one runway available for "touch and go" practice. No facilities would be requested for aircraft basing.

Methodology

The testing of general aviation airport alternatives was performed using a model developed by MTC that compares demand (aircraft owners) with the availability of parking and runway capacity at nearby airports. Aircraft owners were forecasted at the county level and then divided into 440 geographic zones.

Aircraft from each 440 zone were initially assigned to the closest airport. Aircraft that could not be assigned to an airport because of lack of available parking and/or runway capacity were assigned to the nearest airport with excess capacity. If these aircraft could not be assigned to any airport within 30 miles they were counted as "excess demand." The number of aircraft operations and instrument operations was then calculated for all airports in the region. The model considers only locally based aircraft and does not estimate parking requirements for transient aircraft.

The model also divides aircraft owners into two categories, businesses and individuals, and Fixed Base Operators (FBO). Only aircraft owned by businesses and individuals were initially assigned to the general aviation airports. The number of FBO aircraft is a derived demand that results from the local population of aircraft owners and hence service, maintenance, and training needs.

Testing of Alternatives

The airport improvement proposals outlined in the previous section were combined into five major test cases in order to evaluate the regional implications of the different improvement programs. These alternatives are briefly described below.

- GA-1 No Build. This alternative assumes that no major new facilities are built. Only parking improvements currently under way or soon to begin are included as new capacity. Runway capacity levels reflect peak spreading assumptions discussed above.
- GA-2 Major Improvements at Existing Airports. This alternative provides new runways at Gness, Sonoma County, Livermore, Palo Alto, and South County Airport. New parking is also assumed.
- GA-3 New Airports/Hamilton - Fremont - New Contra Costa County. New general aviation airports are included at Hamilton Airport, Fremont, and Contra Costa County. Gness Field, Smith Ranch, and Antioch are closed.
- GA-4 New Airports/Petaluma. Petaluma is acquired and expanded by the City of Petaluma. Santa Rosa Air Center and Sonoma Skypark are closed.
- GA-5 New Airports/Santa Rosa. Santa Rosa Air Center is preserved for public use. Petaluma and Sonoma Skypark are closed.

General Findings

The alternatives discussed in the previous section are by no means all-inclusive; however, they do provide insight into how proposed development at one airport will affect other airports in the system. The major findings from this evaluation are presented below.

- Under the "No Build" alternative, excess demand would be approximately 1000 aircraft in 1987 and 3260 aircraft in 1997.
- With the exception of Marin County, projected 1987 demand could be met by providing additional aircraft parking capacity at existing airports. There would be extensive delays due to runway congestion at almost all airports. (This assumes all private airports continue to remain open.)
- Construction of new runways at Gness, Sonoma County, Livermore, and South County Airport would still not provide sufficient capacity to meet 1997 demand. New airports would be required. These "new" airports could involve acquisition and improvement of existing privately owned airports.
- Pressures on public facilities would be greatly increased by the closing of some or all of the private airports. These airports currently accommodate about 550 aircraft.

Airspace Findings

● **Channelization of Operations**

In visual weather conditions, and outside of the San Francisco Terminal Control Area (TCA) and the airport traffic areas, pilots are free to navigate by visual reference and without interaction with Air Traffic Control (ATC.) Because of the terrain, the San Francisco TCA, and the number of airport traffic areas, the space for uncontrolled Visual Flight Rules (VFR) flight in the Bay Area is quite limited. This limitation tends to channelize VFR traffic in certain areas. During times when low ceilings prevail, the limitations are more severe and additional channelization occurs. VFR aircraft transit the TCA or airport traffic area with ATC approval, but some do not meet equipment or pilot requirements for the TCA or simply do not wish to enter the TCA or airport traffic areas. For these aircraft it is difficult to transit the Bay Area in a northerly or southerly direction. Figure VII-1 shows the TCA, airport traffic areas, and major terrain features. Also shown are routes where VFR traffic tends to be channelized.

● **Flight Training**

The Bay Area General Aviation Airport Managers Group was formed to aid and advise MTC on general aviation matters. One of the concerns of this group is airspace use as it relates to future general aviation needs, including flight training. The group conducted a survey to determine the location of IFR and VFR training areas and airports currently used by Bay Area flight training schools. The group submitted charts and descriptions to MTC for the ten airports generating the greatest amount of general aviation training traffic.

Review of the responses indicates that Oakland International and San Jose Municipal Airports are used for IFR training by essentially all of the training schools in the nine-county Bay Area. These airports are used extensively for precision Instrument Landing System (ILS) training. Buchanan Field, Hayward Air Terminal, Napa County and Livermore Municipal Airports are used for nonprecision IFR training as well. Some schools in the North Bay use Sacramento Executive Airport for ILS training; Stockton Metro Airport is used occasionally by almost all of the other training schools. However, the time lost in transit to and from these airports for training is inhibiting.

A new ILS facility at a location convenient to the majority of flight schools could relieve Oakland International and San Jose Municipal Airports in their role as general aviation ILS training facilities. An ILS at a general aviation airport would have the added benefit of separating general aviation ILS training from air carrier activity.

Review of the responses also indicates concentrations of airborne flight training areas to the south and east of San Francisco Bay. Major overlapping flight training areas exist from the San Jose area and the Santa Clara Valley northward through Newark and Fremont, into the Livermore, San Ramon, and Danville areas, to the east of the coastal hills north of Tracy, and in the area of Byron and Brentwood.

● Instrument Flight Rules (IFR) Interactions

Increased IFR operations at Oakland, Hayward, San Jose, Palo Alto, and Reid-Hillview will have an impact on airspace capacity. Plans that would lead to increased activity at these airports need to be reviewed from an airspace perspective. IFR arrivals to Runway 25 at Alameda NAS limit departures from Runways 27L or 27R at Oakland. When weather is below circling approach minimums, approaches to Runway 27 at Oakland and Runway 25 at Alameda NAS must be staggered to insure that missed approach airspace will be available if needed.

During West Plan operations, IFR approaches to Hayward Air Terminal interact with IFR approaches to Runway 29 at Oakland. These approaches must be staggered to provide adequate radar separation of 3 nautical miles.

During Southeast Plan operations, IFR departures from Palo Alto Airport interact with arrivals to Moffett NAS. At present, the number of IFR departures from Palo Alto is rather limited; consequently, the interaction is not significant.

During both West Plan and Southeast Plan operations, IFR departures from Reid-Hillview Airport must turn toward and pass over San Jose Municipal Airport, resulting in some loss of capacity. The number of IFR departures from Reid-Hillview is at present rather limited; consequently, the interaction is not significant.

Instrument approaches to Napa (Runway 36) would interact with instrument approaches to Hamilton if Hamilton is used for general aviation.

The analysis of West Plan operations conducted as part of the regional airspace analysis indicated that 1997 IFR demand (air carrier, general aviation and military) would cause the approaches to Oakland and San Jose Airports to become overloaded during peak arrival periods. This finding indicates that a) redistribution of some general aviation traffic from the three major air carrier airports to alternative facilities (e.g., Livermore, Napa, Hamilton, Sonoma County) would have a beneficial impact on airport system capacity, b) some general aviation departures may have to be held for long periods and, c) Hayward/Oakland airspace could be reconfigured to increase airspace capacity.

● Visual Flight Rules (VFR) Interactions

Accommodation of additional based aircraft at the most centrally located general aviation airports will increase the density of operations in VFR airspace. Increased density is of concern because a) traffic is already heavily channelized, b) much of the traffic would be located in airspace adjacent to air carrier arrival and departure routes, and c) flight training areas will become more congested. One strategy for reducing congestion would be to encourage aircraft maintenance and service facilities at the centrally located airports and flight training services at the more remote airports.

Environmental Findings

- **Fremont.** Existing land use around Fremont Airport includes a golf course, landfill (refuse disposal), and open space (some wetlands) and is generally compatible with airport operations. The landfill poses a potential bird hazard problem.
- **Oakland North Field.** Land use around the North Field is compatible with increased operations. Jet aircraft must use the South Airport.
- **Hayward.** Land use southeast of the airport is generally compatible. There have been some noise complaints in areas north of the airport. Aircraft single event noise is limited in the late evening by city regulation.
- **Livermore.** There is major residential development to the east. The remainder of the land surrounding the airport is primarily agricultural and recreational (golf course). Additional land acquisition is required to protect approaches to the east and west.
- **Buchanan Field.** Airport noise impacts residential areas in Pleasant Hill and Concord. A preferential runway system is in use. The County is taking additional actions to limit noise. The amount of activity by business jets is an issue.
- **New Contra Costa Airport.** Several proposed sites are located adjacent to existing or proposed development. A proposed site in Oakley is located near wetlands.
- **Gross Field.** A future crosswind runway would extend into wetlands.
- **Hamilton.** There is some residential development to the north. Training activity could overfly this area. Proposed commercial development in the safety zones to the west should be reviewed carefully.
- **Napa County.** Excellent foresight on the part of the County has protected the area around the airport.

- **San Carlos.** The airport is located in an industrial/commercial area on the Bay east of Highway 101. Review of the proposed runway extension is required by the Bay Conservation and Development Commission (BCDC).
- **Half Moon Bay.** The ocean and minor residential development lie to the south; the ocean and the community of Moss Beach to the north. A trailer park is located on the west airport boundary. The airport has a history of noise complaints even at relatively low levels of activity. The County has acquired some land in the approach areas.
- **Moffett NAS.** There are approaches over the golf course and departures over the Bay. Noise from possible training activity is unlikely to impact residential areas.
- **Palo Alto.** Departures turn east over the Bay to reduce noise in surrounding communities. The City of Palo Alto does not support the proposed parallel runway at Palo Alto, due to the presence of a duck pond off the end of the proposed runway and the resulting intensive public use of this area (See Baylands Master Plan).
- **Reid-Hillview.** The airport is a classic case study of encroachment by residential development. As a result, the airport is limited to existing levels of activity.
- **San Jose Municipal.** Most airport noise results from airline activity. The airport is acquiring land and homes to the south. Major general aviation-related noise impacts would be from business jets. Business jets are subject to an "informal" curfew after 10 p.m.
- **South County.** The airport is located in a relatively undeveloped area; however, urbanization of the county is rapidly taking place and is moving southward. Immediate action to protect approaches is required.
- **Nut Tree.** Major new development is possible to the west of the airport (under downwind leg). Vacaville and the County need to provide zoning recommendations for this area. The County has acquired some approach areas.
- **Sonoma County.** Land around the airport is zoned agricultural and open space; however, several homes are located in the approach areas. Expansion of residential development to the north in the Windsor area should be carefully monitored.
- **Petaluma.** Residential development has occurred up to the west boundary of the airport. The City proposes to acquire the airport and relocate the runway to the east. Land on the remaining three sides of the airport would remain in open space.

- **Santa Rosa Air Center.** Land south of the airport is primarily agricultural. A trailer park is located north of the airport. Development from Santa Rosa and Sebastopol could eventually encroach on the airport.
- **New Sonoma Airport.** An earlier county Site Selection/Master Plan study identified a new site in the general location of the existing Sonoma Skypark airport. Land use characteristics of the site are generally favorable; however, the plan has been tabled indefinitely.

Recommended Plan

The recommended plan is shown in Table VII-1. Section VIII discusses the role of each airport in the recommended plan.

Table VII-1

GENERAL AVIATION DEMAND FORECAST: SUMMARY TABLE

ANALYSIS YEAR: 1987

DEMAND LEVEL: HIGH

GENERAL AVIATION ALTERNATIVE: 3

AIRPORT	FHO AIRCRAFT	NON-FHO AIRCRAFT	TOTAL AIRCRAFT	PARKING CAPAC	RUNWAY CAPAC	REVISED RUNWAY CAPAC	TOTAL ANNUAL OPERATN	ANNUAL INST. OPERATN	EXCESS DEMAND	LATENT TRAINING DEMAND	AVERAGE DISTANCE
SMITH RANCH	4.5	70.5	75.0	75.	115000.	115000.	48607.	0.0	0.0	0.	2.7
GROSS	31.4	296.0	327.4	375.	370000.	370000.	271730.	0.0	0.0	0.	12.0
PETALIUMA	9.0	141.0	150.0	150.	250000.	250000.	135000.	0.0	0.0	0.	1.5
SONOMA VALLEY	4.0	62.6	66.6	100.	145000.	145000.	43207.	0.0	0.0	0.	1.5
SONOMA SKYPARK	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
SONOMA COUNTY	80.3	464.4	544.6	550.	500000.	500000.	283213.	33135.9	0.0	0.	3.5
SANTA ROSA	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
SEA RANCH	0.3	4.7	5.0	5.	115000.	115000.	3245.	0.0	0.0	0.	0.0
HEADSHUNG	3.1	47.9	50.9	80.	145000.	145000.	63636.	0.0	0.0	0.	0.0
CLOVERDALE	1.8	28.9	30.8	36.	145000.	145000.	38459.	0.0	0.0	0.	0.0
CALISTOGA	0.7	11.3	12.0	12.	145000.	145000.	14772.	0.0	0.0	0.	6.9
ANGWIN	1.5	23.5	25.0	25.	145000.	145000.	15975.	0.0	0.0	0.	6.2
POPE VALLEY	0.2	2.8	3.0	3.	115000.	115000.	1950.	0.0	0.6	0.	0.0
NAPA COUNTY	48.8	235.4	284.2	310.	490000.	490000.	397938.	39793.8	0.0	0.	7.9
RIO VISTA	1.6	25.3	26.9	60.	145000.	145000.	31955.	0.0	0.0	0.	0.0
MAINE PRAIRIE	0.5	7.5	8.0	8.	145000.	145000.	5088.	0.0	0.0	0.	2.9
VACA-DIXON	0.5	7.5	8.0	8.	145000.	145000.	4800.	0.0	0.0	0.	0.0
NUT TREE	10.9	158.1	169.0	175.	250000.	250000.	202818.	0.0	0.0	0.	5.7
VACAVILLE	0.6	9.4	10.0	10.	115000.	115000.	6670.	0.0	0.0	0.	0.0
ANTIOCH	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
BUCHANAN	132.0	568.0	700.0	700.	485000.	439410.	392700.	19635.0	0.0	83300.	6.2
OAKLAND	168.6	657.9	826.5	900.	600000.	600000.	562037.	87115.6	0.0	0.	14.8
HAYWARD	75.3	453.7	529.0	600.	500000.	500000.	375593.	21033.2	0.0	0.	6.2
FREMONT SKYSAIL	0.7	11.3	12.0	12.	115000.	115000.	7800.	0.0	0.0	0.	0.0
LIVERMORE	27.0	273.1	300.1	360.	485000.	485000.	285114.	6272.5	0.0	0.	7.7
SOUTH COUNTY	29.3	285.3	314.6	500.	500000.	500000.	314604.	0.0	0.0	0.	9.5
MORGAN HILL	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
HEID-HILLVIEW	135.0	595.0	730.0	730.	500000.	500000.	386899.	10059.4	0.0	0.	7.5
SAN JOSE MUNI	140.3	664.0	804.3	804.	660000.	597960.	451187.	74445.8	0.0	95707.	8.4
FREMONT	9.0	141.0	150.0	150.	500000.	500000.	135000.	0.0	0.0	0.	6.7
PALO ALTO	69.2	440.8	510.0	510.	265000.	240090.	214582.	9656.2	0.0	45518.	4.9
SAN CARLOS	63.6	426.5	490.1	650.	270000.	244620.	244622.	6115.6	0.0	51890.	4.6
HALF MOON HAY	9.0	141.0	150.0	150.	180000.	180000.	180000.	0.0	0.0	0.	13.6
HAMILTON	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
MCCFETT NAS	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
ALAMEDA NAS	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW CC CTY (HIGH)	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW CC CTY (OAK)	3.4	53.0	56.4	150.	250000.	250000.	50744.	0.0	0.0	0.	6.3
NEW CC CTY (BRNT)	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW SONOMA	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
TOTALS	1062.0	6307.4	7369.4	8198.	8790000.	8632080.	5169935.	307262.8	0.6	276414.	7.4

Table VII-1

GENERAL AVIATION DEMAND FORECAST: SUMMARY TABLE

ANALYSIS YEAR: 1997

DEMAND LEVEL: HIGH

GENERAL AVIATION ALTERNATIVE: 3

AIRPORT	FBO AIRCFT	NON-FBO AIRCFT	TOTAL AIRCFT	PARKING CAPAC	RUNWAY CAPAC	REVISED RUNWAY CAPAC	TOTAL ANNUAL OPERATN	ANNUAL INST. OPERATN	EXCESS DEMAND	LATENT TRAINING DEMAND	AVERAGE DISTANCE
SMITH RANCH	4.5	70.5	75.0	75.	115000.	115000.	48607.	0.0	2.2	0.	2.3
GROSS	53.2	392.6	445.8	490.	370000.	370000.	369999.	0.0	0.0	0.	10.9
PETALUMA	20.0	230.0	250.0	250.	250000.	250000.	225000.	0.0	0.0	0.	1.9
SONOMA VALLEY	6.0	94.0	100.0	100.	145000.	145000.	64900.	0.0	0.0	0.	0.0
SONOMA SKYPARK	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
SONOMA COUNTY	138.2	631.8	770.0	770.	500000.	500000.	400400.	66065.9	0.0	0.	2.7
SANTA ROSA	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
SEA RANCH	0.3	4.7	5.0	5.	115000.	115000.	3245.	0.0	0.2	0.	0.0
HEALDSBURG	6.6	103.4	110.0	110.	145000.	145000.	137500.	0.0	0.0	0.	9.7
CLOVERDALE	2.2	33.8	36.0	36.	145000.	145000.	45000.	0.0	1.4	0.	0.0
CALISTOGA	0.7	11.3	12.0	12.	145000.	145000.	14772.	0.0	0.8	0.	0.0
ANGWIN	1.5	23.5	25.0	25.	145000.	145000.	15975.	0.0	0.0	0.	6.3
POPE VALLEY	0.2	2.8	3.0	3.	115000.	115000.	1950.	0.0	4.0	0.	0.0
NAPA COUNTY	63.9	313.3	377.1	490.	490000.	490000.	377146.	55063.3	0.0	0.	8.6
RIO VISTA	4.8	75.2	80.0	80.	145000.	145000.	95120.	0.0	0.0	0.	13.5
MAINE PRAIRIE	0.5	7.5	8.0	8.	145000.	145000.	5088.	0.0	0.0	0.	2.9
VACA-DIXON	0.5	7.5	8.0	8.	145000.	145000.	4800.	0.0	44.2	0.	0.0
NUT TREE	20.0	230.0	250.0	250.	250000.	250000.	250000.	0.0	0.0	0.	4.4
VACAVILLE	0.6	9.4	10.0	10.	115000.	115000.	6670.	0.0	0.0	0.	0.0
ANTIOCH	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
BUCHANAN	139.0	644.3	783.3	840.	485000.	439410.	439410.	31637.6	0.0	93209.	5.1
OAKLAND	172.3	715.3	887.6	1000.	600000.	600000.	603570.	106831.9	0.0	0.	14.3
HAYWARD	132.4	571.8	704.2	850.	500000.	500000.	499999.	40999.9	0.0	0.	6.5
FREMONT SKYSAIL	0.7	11.3	12.0	12.	115000.	115000.	7800.	0.0	0.0	0.	0.0
LIVERMORE	66.0	434.0	500.0	500.	485000.	485000.	475000.	16150.0	0.0	0.	9.8
SOUTH COUNTY	66.0	434.0	500.0	500.	500000.	500000.	500000.	0.0	5.8	0.	5.4
MORGAN HILL	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
REID-HILLVIEW	135.0	595.0	730.0	730.	500000.	500000.	386899.	14315.3	0.0	0.	7.4
SAN JOSE MUNI	140.3	664.0	804.3	804.	660000.	597960.	451187.	105577.7	137.7	95707.	7.7
FREMONT	20.0	230.0	250.0	250.	500000.	500000.	225000.	0.0	0.0	0.	12.8
PALO ALTO	69.2	440.8	510.0	510.	265000.	240090.	214583.	14591.6	189.7	45518.	4.5
SAN CARLOS	63.6	426.5	490.1	500.	270000.	244620.	244623.	8317.2	65.7	51890.	5.6
HALF MOON BAY	9.0	141.0	150.0	250.	180000.	180000.	180000.	0.0	0.0	0.	9.5
HAMILTON	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
MCFEET NAS	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
ALAMEDA NAS	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW CC CTY(RICH)	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW CC CTY(OAK)	12.0	167.9	179.9	250.	500000.	500000.	161875.	0.0	0.0	0.	10.3
NEW CC CTY(BRNT)	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
NEW SONOMA	0.0	0.0	0.0	0.	0.	0.	0.	0.0	0.0	0.	0.0
TOTALS	1349.0	7717.2	9066.2	9718.	9040000.	8882080.	6456107.	459550.3	451.8	286323.	7.3

VIII. AIRPORT ROLES AND DEVELOPMENT COSTS

The following is a discussion of the role of each airport in the regional general aviation system. Development costs are taken from the Regional Transportation Improvement Program and cover major development items in the next 5-6 years.

Alameda 1.1. Oakland Airport

- Role: The existing runway configuration has a very high theoretical capacity. The central location and amount of undeveloped land at the North Airport also makes Oakland a prime location for adding new aircraft storage. The complexity of the airspace in the Bay Area and Oakland's close proximity to other airports suggests the need to consider the impact of increased activity on airspace use. Over the long range, training activity may have to be limited or shifted to other airports to enhance the safe and efficient use of the surrounding airspace.

Construction of the Executive Terminal and development of a full range of corporate and business aircraft maintenance facilities will make Oakland attractive for itinerant aircraft use. The growing volume of Commuter airline activity also suggests that the North Airport could be developed as a major Commuter airline hub.

	<u>Costs</u>
- Expand aircraft parking	\$1,250,000
- Overlay portions of existing ramp	\$ 400,000
- Runway 15/33 parallel taxiway	\$ 550,000
- Runway 27 connecting taxiway	\$ 200,000
- Utilities for New Corporate Aviation Area	\$ 350,000

Alameda 1.2. Hayward Airport

- Role: As a major urban airport, Hayward will perform a role similar to that of Oakland but may be required to handle a larger proportion of training activity. Development of existing parking areas will enable the airport to accommodate about 600 aircraft. Relocation of the Air National Guard to Moffett Field NAS will make additional land available for aircraft parking on the west side of the airport. This area could accommodate 250 to 400 aircraft.

Expansion of both Oakland and Hayward Airports to their full parking capacity could result in a substantial deficiency in local area runway capacity for training purposes. The proximity of the

two airports coupled with the projected increase in traffic suggests the need to review airspace interactions and training needs prior to major new development in the Air National Guard Area. Development of corporate aircraft service and maintenance facilities is also planned.

	<u>Costs</u>
- Reconstruct runway and taxiway lighting	\$ 481,000
- East side taxiway drainage	\$ 196,000
- High speed runway turnoffs	\$ 236,000
- New taxiway east of Runway 28R	\$ 450,000

Alameda 1.3. Livermore Airport

- Role: Livermore will continue to provide aircraft storage space and facilities for local aircraft owners in the Livermore/Amador Valley. However, with the installation of full Instrument Landing System (ILS), it is anticipated that flight training schools at nearby airports will shift some of their precision instrument training activity to Livermore to avoid increasing aircraft traffic in and around San Jose and Oakland Airports. This traffic combined with increased local traffic will foster the need for a separate parallel training runway. Development of the south side of the airport for aircraft storage would bring the airport to its ultimate capacity. Commuter airline service could be provided from the Livermore area to San Francisco and Oakland Airports.

	<u>Costs</u>
- Land Acquisition - east clear zone and approach area	\$2,249,000
- Land Acquisition - south side airfield development (20 Ac.)	\$2,240,000
- Land Acquisition - west clear zone and approach area	\$2,376,000
- Northwest apron expansion	\$1,077,000
- Northeast apron expansion and taxiway	\$ 225,000
- Parallel runway and taxiways	\$ 617,000
- South side apron and taxiways	\$1,714,000
- Perimeter fencing and gates	\$ 72,000

Alameda 1.4. Fremont Airport

- Role: A site selection/master plan study should be conducted to evaluate the feasibility of acquiring the existing privately owned airport for public development and use. The study should address the potential for a full service airport with parallel runways and an ILS capability. The airport could ultimately serve 500 based aircraft by 1997. Alternatively, two runways could be constructed and the number of aircraft parking spaces limited. One runway would, in effect, accommodate activity by aircraft based at the airport while the second runway would satisfy a broader areawide need for a dedicated training facility. Since the airport would serve several jurisdictions and since the revenue potential would be limited by the parking constraint, joint financing should be considered.

Alameda 1.5 Fremont Sky Sailing Airport

- Role: Fremont Sky Sailing is privately owned; it serves primarily as a recreational airport for glider enthusiasts. The site should be evaluated as part of the site selection/master plan study discussed above.

Contra Costa 1.1. Buchanan Field

- Role: Buchanan Field serves aircraft activity in central Contra Costa County and provides a full range of aviation services. A high proportion of current activity is training flights. The County is proceeding with plans to develop a reliever airport to serve training flights from Buchanan and to ultimately accommodate future growth in County aircraft owners. Diversion of some training activity to the reliever airport will enable Buchanan to handle additional traffic produced by the expansion of aircraft parking on the west side of the airport. The instrumentation capability of the airport should be upgraded to the maximum extent possible. Commuter airline service will link Buchanan to the Bay Area airports and other locations in northern California.

	<u>Costs</u>
- Acquire approach protection (14R and 14L)	\$1,200,000
- Westside aircraft parking	\$1,250,000
- Westside sanitary system	\$ 450,000
- Miscellaneous airfield improvements (strengthen taxiway C, taxiway and runway lighting, holding aprons)	\$ 546,500

Contra Costa 1.2. New Reliever Airport

- Role: The new airport will augment aircraft storage and provide a reliever training facility for the County. Assuming that additional aircraft parking is developed on the west side of Buchanan Field, the requirement for parking at the reliever airport will be that produced by local aircraft owners and the possible closure of the Antioch Airport. Although a second runway may not be required until the long range, it may prudent to construct the parallel runway at an earlier date rather than defer construction and pay the escalated costs. The estimated cost of the new airport ranges from \$10-12 million depending on the site selected.

	<u>Costs</u>
- Land acquisition (includes approach area and administrative costs)	\$1,500,000
- First stage construction (runway, taxiway, parking apron)	\$1,300,000
- Second stage construction	\$ 600,000

Contra Costa 1.3. Antioch Airport

- Role: Privately owned Antioch may or may not close as the result of County development of the reliever airport. For some County sites, the need to acquire adequate airspace may necessitate the closure of Antioch Airport and reimbursement to the owner.

Marin 1.1. Gness Field

- Role: With an ultimate parking capacity of 490 aircraft, Gness Field could handle a sizeable portion of the projected activity in the county. Because existing space for aircraft storage within the present airport boundaries will soon be exhausted, the County should consider development of a crosswind runway and additional aircraft parking. In addition to providing greater runway capacity, the crosswind runway will enhance airport safety. Retention of Smith Ranch (private ownership) would also be necessary to meet total County demand. Facilities should be provided for Commuter airlines to serve San Francisco and Oakland Airports.

	<u>Costs</u>
- Expand tiedown apron	\$ 172,000
- Reprofile runway and taxiway	\$ 372,000
- Land acquisition for new runway/taxiway complex	\$ 369,000
- Site preparation for crosswind runway and taxiway	\$ 550,000

Marin 1.2 Hamilton Field

- Role: Acquisition of surplussed Hamilton Airport by the county or some other public entity should be considered in the context of local and regional general aviation requirements. In addition to serving local area needs, Hamilton may be able to relieve air carrier airports, such as Oakland's North Field, by providing facilities and services for visual and instrument flight training. Adequate aircraft parking capacity exists to accommodate nearly all of the county aircraft population through 1997. The width of the existing runway may be sufficient to provide a parallel runway system consisting of a 150-foot-wide main runway and a 50-foot-wide training runway separated by 300 feet. In this configuration, the airport would have a capacity of about 400,000 annual operations. If the two-runway system is not feasible, the airport could still accommodate a large number of based aircraft; however, some training activity would have to be conducted at other local airports. An instrument approach could be established over the Bay. Surplus military structures adjacent to the airfield could provide space for a general aviation terminal/administration building and for various aviation-related businesses.

Airport improvement and operating costs for Hamilton and Gness should be developed on a comparative basis to assist local decision makers. If both Gness and Hamilton are used for general aviation, the capacity of the two airports would exceed projected county demand for a number of years. Development of both airports would also affect airport development in southern Sonoma County.

Costs

- | | |
|---|--------------------------------------|
| - general rehabilitation including runway,
dikes, drainage system, electrical system,
sanitary system, etc. | Estimates
vary over
wide range |
|---|--------------------------------------|

Marin 1.3. Smith Ranch Airport

- Role: Privately owned Smith Ranch serves about 75 aircraft. The condition of the existing airport does not warrant public acquisition or improvement. Continuation of the operating permit should be encouraged until such time as the County can provide sufficient space for the existing aircraft.

Napa 1.1. Napa County Airport

- Role: Napa County Airport provides parking space for aircraft owners in Napa, Solano, and to a more limited extent, Sonoma County. Growth in the number of aircraft owners in Napa County will be modest, in line with county growth policies. The Airport Master Plan provides sufficient aircraft storage capability to

serve county needs as well as complement airport development plans in the surrounding counties. Training activity, such as that conducted by IASCO for foreign airlines, will continue as a special activity generator at the airport. The airport also serves a recreational role by providing air access to the Napa Valley. Commuter airline service to San Francisco and Oakland airports is possible. Installation of an ILS will complement both the training and Commuter airline role.

	<u>Costs</u>
- Approach area (Runway 18R)	\$ 975,000
- Expand aircraft parking	\$ 840,000
- Acquire land for future airport development	\$ 300,000
- Other apron, hangar, and taxiway improvements	\$1,172,000
- Airport perimeter access road and new auto parking	\$ 422,000

Napa 1.2. Angwin Airport

- Role: The airport is privately owned and largely used by a local flying club. The need for public acquisition is unlikely.

Napa 1.3. Calistoga Airport

- Role: The airport is leased by the City and serves primarily as a recreational airport for glider enthusiasts.

San Mateo 1.1. San Carlos Airport

- Role: The principal roles of San Carlos Airport will be to accommodate county aircraft owners and to relieve San Francisco Airport of VFR general aviation traffic. (Installation of an ILS at San Carlos would not be feasible because of airspace interactions with San Francisco Airport.) The role of the airport would be enhanced by extension of the existing runway. Acquisition of property adjacent to the airport could increase aircraft storage capacity to about 650 aircraft. However, development of additional parking would generate more training activity than could be handled by local area airports.

	<u>Costs</u>
- Land acquisition (Piombo #1)	\$ 980,000
- Aircraft parking (Piombo #1)	\$ 138,000
- Aircraft Parking (Parcel #2)	\$ 357,000
- Runway extension	\$ 482,000
- Overlay runway and taxiway	\$ 184,000
- Acquire additional approach area	\$ 500,000
- Pave drift off areas	\$ 240,000

San Mateo 1.2. Half Moon Bay Airport

- Role: Half Moon Bay is somewhat remote and therefore not heavily utilized by county aircraft owners. Weather conditions also limit use of the airport. The airport primarily serves county aircraft owners in coastside communities. The airport is also used by recreational flyers visiting the coast. Construction of hangars for protection of aircraft from the weather would attract more owners to the airport. The relatively low aircraft storage demand at Half Moon Bay will enable the airport to handle training activity from San Carlos. Various taxiway improvements should be considered to increase the capacity of the single runway. Although installation of a practice ILS would be desirable, the County has decided against this improvement because of the amount of land that would have to be acquired to protect the airport approach areas.

	<u>Costs</u>
- Displaced thresholds	\$ 15,000
- New aircraft parking	\$ 78,000
- Security fencing	\$ 80,000
- Replace Runway and Taxiway Lights	\$ 95,000

Santa Clara 1.1. Palo Alto Airport

- Role: The Palo Alto Airport is approaching its capacity both in terms of aircraft parking space and runway capacity. The only major improvement to be considered is the possible construction of a parallel runway to adequately serve the training demand generated by Palo Alto and by other airports in the area. Preliminary discussions with the City of Palo Alto indicate that the City would

not support the construction of a parallel runway and would favor the use of either Fremont Airport or Moffett Field. (See the adopted Baylands Master Plan governing the airport area.) However, since the need for a reliever training runway in the South Bay is critical, it is recommended that the priority for meeting this need be established as follows:

- interim use of Moffett Field until Fremont or another fully utilized training runway can be developed
- development of a new airport in the Fremont area to meet long-range needs
- construction of a parallel runway at Palo Alto (least preferred alternative)

	<u>Costs</u>
- Resurface Taxiway and Apron	\$ 300,000
- Reconstruct Existing Levee	\$ 480,000

Santa Clara 1.2. Reid-Hillview Airport

- Role: Reid-Hillview Airport currently accommodates 730 aircraft and has reached its practical capacity. Although some additional airport land is available for aircraft parking, it is not recommended that the County encourage further development due to the nature of the surrounding land use and the density of aircraft activity in the immediate area. The airport should continue in its present role of relieving demand at San Jose. The County should continue to implement necessary operational and safety improvements. If pressure to close the airport is exerted in the future, an alternative site for relocating the existing aircraft population should be provided by the County.

	<u>Costs</u>
- Construct cross-taxiway and reconstruct lighting	\$ 390,000
- Construct west taxiway	\$1,000,000

Santa Clara 1.3. San Jose Municipal Airport

- Role: The Airport Master Plan addresses future general aviation requirements at the airport. Both increased air carrier activity and increased general aviation activity are anticipated; therefore, a balance between the two must be achieved. The regional plan

proposes the expansion of air service at San Jose Airport and raises the issue of whether expanded general aviation activity would conflict with this policy. In recognition of the future air carrier role for San Jose and in the interest of air safety, it is recommended that the growth in the number of general aviation operations be minimized or preferably reduced through a) airport controls on the amount of new aircraft parking space provided, and b) the development of a convenient reliever airport in the area for flight training. Development of additional aircraft parking on the airport would be most appropriate following agreements with the military for interim use of Moffett, agreements with flight training schools to make greater use of other airports, or the construction of new runways at South County, Fremont or Palo Alto.

The Airport Master Plan recommends development of the west side for general aviation and retention of existing hangars on the south end of runway 30. Runway 11-29 would be extended and widened to better serve activity on the west side and the taxiway system would be greatly expanded. Use of the airport by business and corporate aircraft is likely to increase, and there will be continuing demand for facilities to park and service these types of aircraft.

	<u>Costs</u>
- West side apron construction	\$1,650,000
- Runway 29 widening, extension and lighting	\$1,225,000
- Taxiway improvements to serve west side	\$1,679,000

Santa Clara 1.4. South County Airport

- Role: Though not as conveniently located as other county airports, South County Airport will serve a major role in meeting future county general aviation needs. Substantial area is available for expanded aircraft parking and for construction of a second runway. Development of these facilities should serve a large portion of county aircraft basing needs through the forecast period. South County airport could also accommodate some of the county training demand with a second runway but would be a less fuel-efficient alternative for aircraft operators compared to other sites. Also terrain features and the existence of a major VFR traffic corridor in the Santa Clara Valley make this a less desirable location for training compared to other sites.

	<u>Costs</u>
- Construct runway and lights	\$1,000,000
- Expand aircraft parking (Stage 1)	\$1,200,000
- Expand aircraft parking (Stage 2)	\$1,300,000

Santa Clara 1.5. Moffett Field

- Role: Moffett Field could provide training relief for San Jose and Palo Alto airports. It is recommended that joint use be pursued as an interim measure until other more permanent and suitable long-range methods for training relief are developed as discussed above. Should Moffett Field be surplused, the County should consider acquisition as a general aviation airport.

Santa Clara 1.6. Morgan Hill Airport

- Role: Morgan Hill, a privately owned airport, is considered likely to close. Aircraft owners would probably relocate to South County airport. South County therefore must be planned to accommodate the displaced aircraft from Morgan Hill.

Solano 1.1. Nut Tree Airport

- Role: As the County's principal airport, Nut Tree will be required to accommodate county general aviation needs through the forecast period. Forecasts show that Nut Tree will not accommodate all of the county activity in the long range. The magnitude of the excess demand, however, would not in and of itself necessitate a second runway. In addition to serving county aircraft storage requirements, Nut Tree accommodates a significant amount of recreational flying associated with the Nut Tree restaurant complex. Commuter airline service to Bay Area airports may become feasible at some point in the future.

	<u>Costs</u>
- Runway reconstruction and marking	\$ 210,000
- South apron expansion	\$ 110,000
- Creek relocation and culvert	\$ 90,000
- Parallel taxiway	\$ 175,000
- North apron expansion	\$ 145,000

Solano 1.2. Rio Vista Airport

- Role: Local service airport. Rio Vista is publicly owned, but its location is not well suited to meeting county demand. Nevertheless, aircraft storage requirements would reach 80 aircraft in the long range. Any future improvements should be coordinated with the County as part of the annual Transportation Improvement Program (T.I.P).

Solano 1.3. Vacaville Airport

- Role: Vacaville is a privately owned airport and serves primarily as a recreational airport for glider enthusiasts.

Sonoma 1.1. Sonoma County Airport

- Role: Sonoma County Airport is capable of handling a large share of future growth in aircraft ownership within the county. The Master Plan shows a potential for accommodating up to 770 locally based aircraft. A training runway is programmed for construction and will provide a significant increase in runway capacity.

In order to preserve the airport's future capability, a high priority should be attached to acquiring land in the airport approach areas. Santa Rosa's location with respect to the air transportation system makes general aviation an attractive way to reach the developing commercial and industrial activities in this part of the region. Also regional and Commuter airlines have historically provided service between Santa Rosa, the Central Bay Area, and other communities in northern California; the need for this service is expected to continue.

	<u>Costs</u>
- Acquisition of land in approach areas	\$1,700,000+
- Construct new aircraft parking	\$ 500,000
- Construct new runway	\$ 550,000
- Security fencing	\$ 200,000
- New vehicle parking and access roads	\$ 163,000

Sonoma 1.2. Santa Rosa Airport

- Role: Once used as a Navy base, the Santa Rosa Airport has a 200 x 7000 foot long runway and existing apron for 220 aircraft. The County is interested in evaluating the potential for public acquisition as a reliever airport for Sonoma County Airport. Urban expansion in the Santa Rosa area makes such a study timely.

Because of the number of airports in the county and constraints on airport development funds, it is recommended that the County develop a long-range master plan that reflects County priorities as well as future financial constraints. Results of the regional study indicate that County needs could be adequately met by expansion of Sonoma County Airport and development of an additional public airport with aircraft storage capacity for approximately 250

aircraft. Either Santa Rosa Air Center, Petaluma Airport, or a new airport in the southern part of the County could meet this need.

Sonoma 1.3. Petaluma Airport

- Role: The City proposes to acquire the existing privately owned airport and relocate the main runway eastward to provide greater separation between aircraft operations and neighboring communities. The capability of the airport would be equivalent to the recommended new airport above and would serve local aircraft owners in the southern part of the county. Acquisition of the site is recommended; however, major future development must be considered in the context of the countywide airport master plan, regional concerns related to competing airport development proposals in Marin and Sonoma Counties, and overall constraints on future airport development funds.

	<u>Costs</u>
- Acquire land, prepare site, and construct new runway with appropriate lighting and navigational aids. Construct aircraft parking and other facilities.	\$2,347,000

Sonoma 1.4. Healdsburg Airport

- Role: Local service airport. The airport could serve about 110 aircraft after the construction of additional tiedown areas.

	<u>Costs</u>
- Maintenance hangar	\$ 100,000
- Underground fuel storage	\$ 35,000
- Parallel taxiway	\$ 100,000
- New tiedowns	\$ 132,000
- Water distribution and sewage system	\$ 46,000

Sonoma 1.5. Cloverdale Airport

- Role: Local service airport. The airport could accommodate about 36 aircraft.

	<u>Costs</u>
- New tiedowns	\$ 62,000
- Runway 14 overrun	\$ 15,000
- Approach area acquisition	\$ 9,500
- Underground fuel storage	\$ 12,000

Sonoma 1.6. Sonoma Skypark Airport

- Role: The airport operates on a temporary use permit. It is anticipated that the permit will not be renewed and that operations will be consolidated with other local airports.

Sonoma 1.7. Sonoma Valley Airport

- Role: The airport is privately owned and serves a unique clientele including owners of experimental aircraft and acrobatic flyers. The airport is located on low ground and is subject to periodic flooding. While there is no interest in public acquisition, the role of the airport is unique and its existence should be preserved.

Sonoma 1.8. New Sonoma Airport

- Role: The County completed a Site Selection/Master Plan Study to develop an airport in the southern part of the county. The plan recommended that either a new Sonoma Airport be constructed to replace Sonoma Skypark or a public airport be developed in the Petaluma area. The recommendations from this study have been accepted by the Board of Supervisors; however, there does not appear to be local support for a new airport in the Sonoma area.

VIII. APPENDIX

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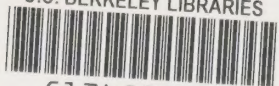
NUMBER OF BASED AIRCRAFT BY AIRPORT AND YEAR (Cont'd)

COUNTY	AIRPORT	YEAR													
		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Sonoma	Coddington	87	79	79	79	79		76	7	X CLOSED			6		12
	Cloverdale	7	14	12	15	11		11	11	16			14	30	30
	Healdsburg	21	19	14	18	22		23	27	30			52	70	70
	Petaluma	36	45	65		70		54					90		102
	Santa Rosa			3	30		41	60	90						0
	Sea Ranch					3	6	1							
	Sonoma Co.	69	97	123	130	142	167	206	238	253	267	283	252		300
	Sonoma Sky.			15	15	15		35	55	CLOSED			17		32
	Sonoma Valley	20	27	23	20	25	30	62	62				61	75	75
	Other	2	5	4	3	6	3	0	6	7	7	8	8		12

* Excludes Gliders

Source: Airport Manager Records and FAA Form 5010

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